Transit Electrification Update

CTB Transit & Rail Subcommittee (April 19, 2022)

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Virginia Department of Rail and Public Transportation

Transit Vehicle Types in Virginia

2,168

Transit Buses in Virginia

Heavy Duty Bus (49%)

Van (4%)

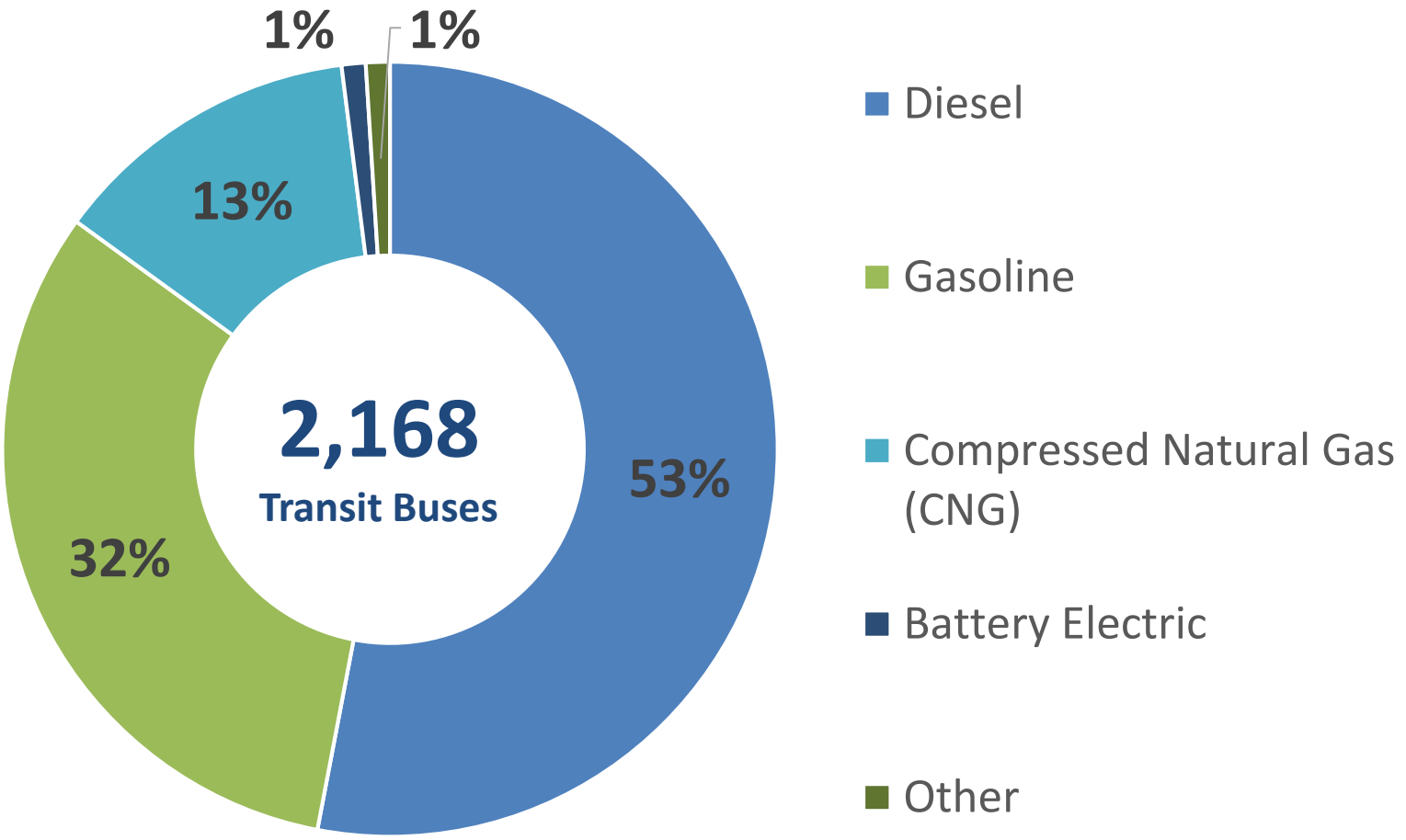
Cutaway (36%)

Articulated (1%)

Coach (10%)

DRPT

Transit Vehicle Fuel Types in Virginia



Battery Electric Buses (BEBs) in Virginia

26

BEBs in-service

ALEXANDRIA TRANSIT COMPANY DASH

HAMPTON ROADS TRANSIT

BT Blacksburg TRANSIT

Jaunt

31

BEBs ordered or waiting to be ordered

BT Blacksburg TRANSIT

FAIRFAX CONNECTOR

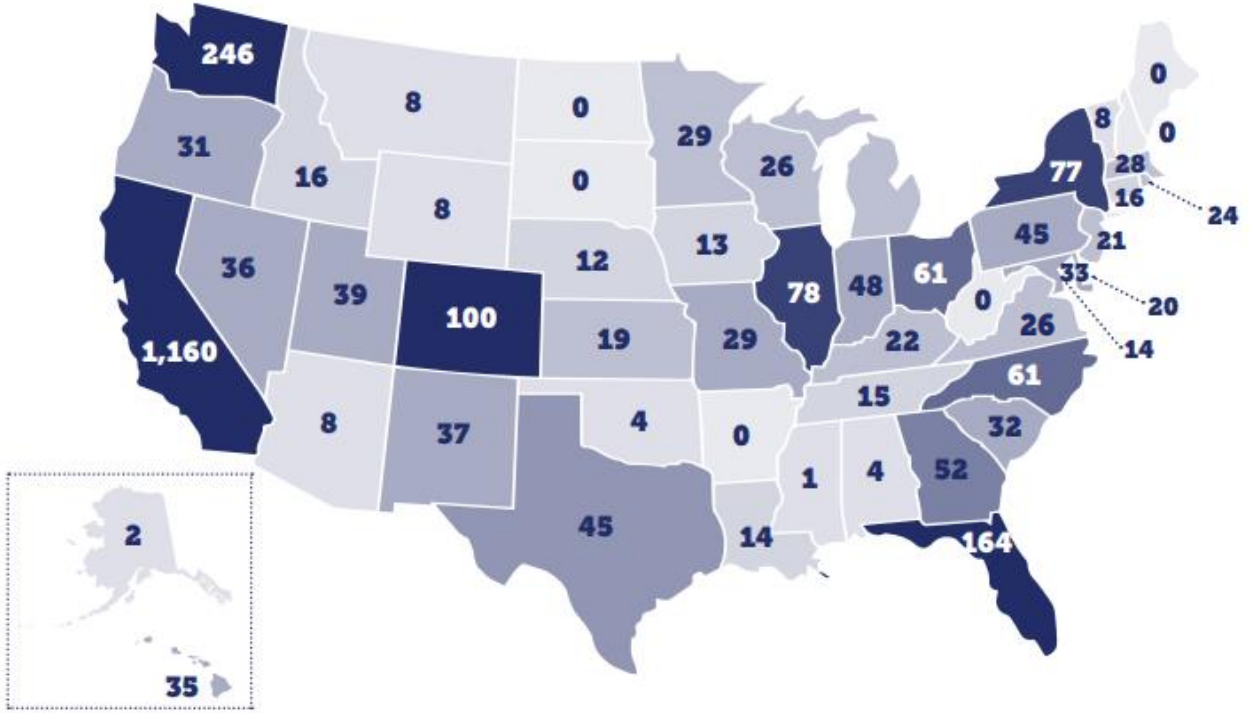
Valley Metro Roanoke, Virginia

LoudounCounty LC Transit

DRPT

Current BEB Landscape

Zero Emission Buses by State (2021)*



2,790

Total Zero Emission Buses Nationwide

Note: Includes both battery electric and hydrogen fuel cell heavy duty buses

Current BEB Landscape

Pros

- ✓ Zero tailpipe emissions
- ✓ Reduced noise pollution
- ✓ Lower total cost of ownership*
- ✓ Federal government subsidies
- ✓ Improved public perception

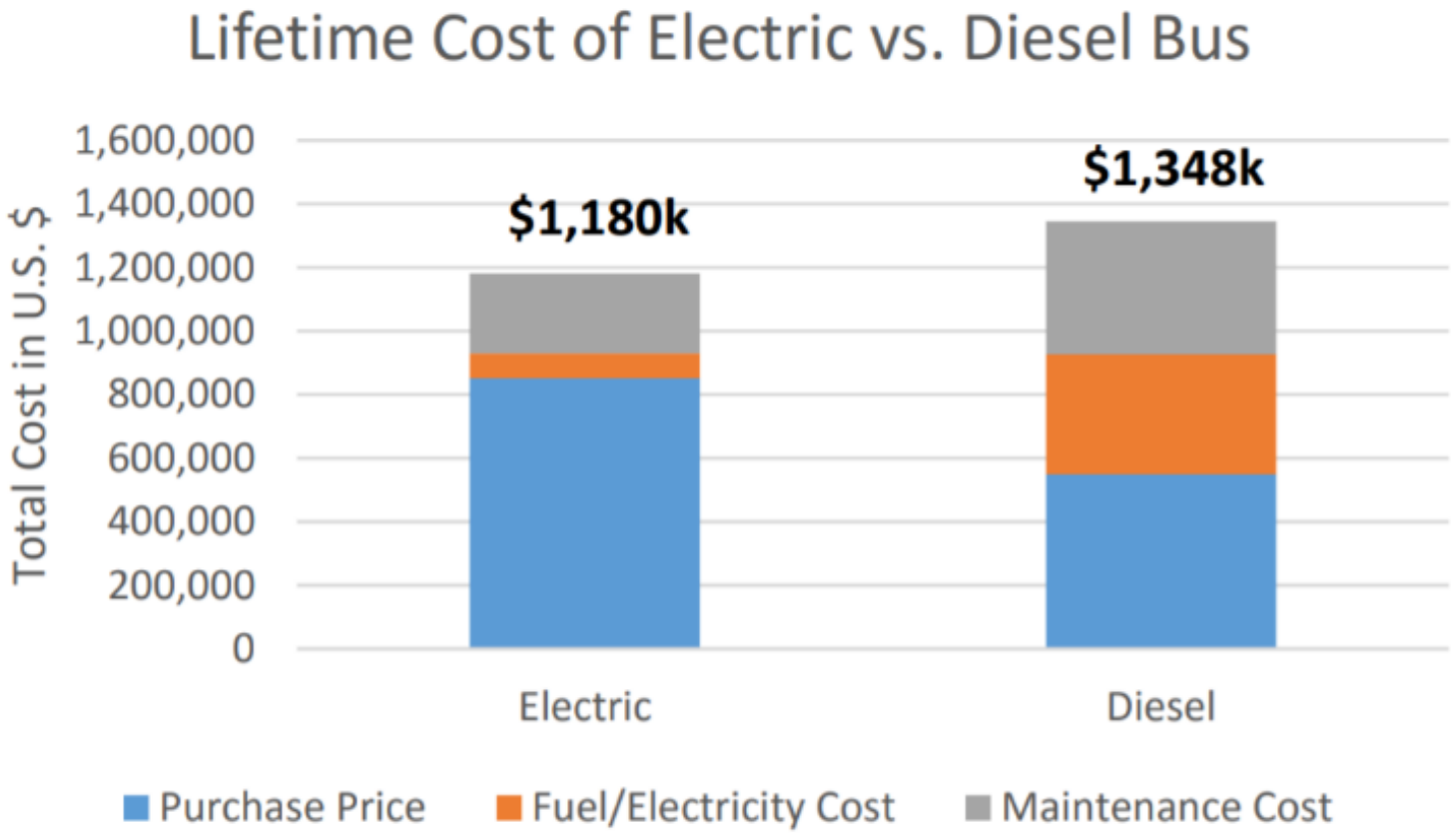
Cons

- ✓ Higher upfront capital costs
  - *Vehicles*
  - *Charging infrastructure*
  - *Facility retrofits*
- ✓ Less predictability (range & performance)
- ✓ Battery range may limit route scheduling
- ✓ Knowledge barriers
- ✓ Limited small vehicle options

Current BEB Landscape

- BEB demand continues to increase
- Cost per unit is expected to drop as manufacturing process becomes more efficient
- Technology advancements in battery capacity and charging infrastructure (i.e. faster charging) reducing concerns on range and route scheduling

BEB Total Cost of Ownership



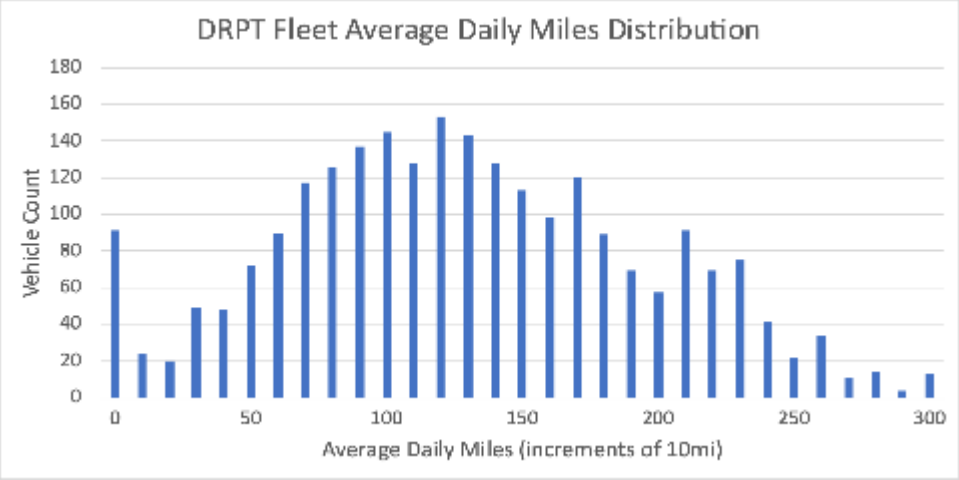
Source: Columbia University

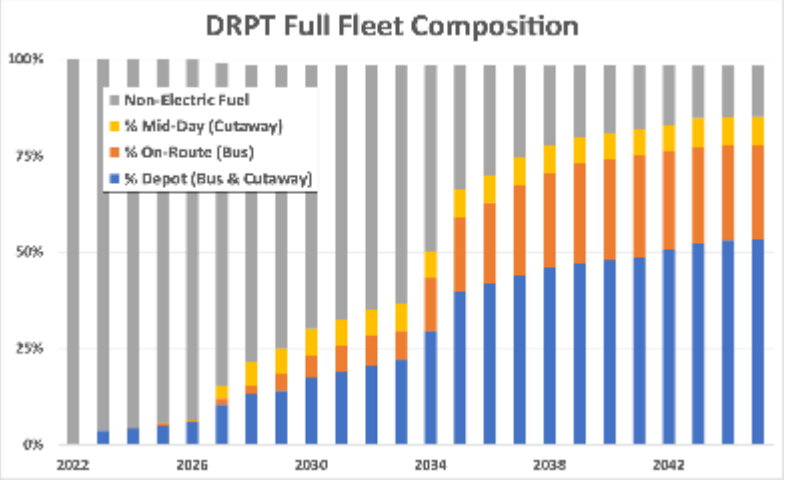
BEB Key Considerations

1. Goal setting: What is the agency's motive for electrifying? Environmental stewardship? Cost savings? Customer satisfaction?
   - *Performance measures*
2. Industry collaboration and research is critical for successful BEB deployments
   - *Site visits*
   - *Demonstrations*
3. Coordination with utility provider to understand existing infrastructure and limitations
   - *Rate modeling*
   - *Facility assessments*
4. Disaster planning

Statewide BEB Analysis

- Preliminary cost estimates for statewide transit electrification by 2045 include:
  - **$800M** incremental cost to convert transit vehicles to electric ($1.6B total cost)
  - **$300M** to design, upgrade and install charging infrastructure
- Future impact on MERIT Capital and MERIT Operating programs





BEB Funding Opportunities

Regional

- *Congestion Mitigation Air Quality Improvement Program (CMAQ)*
- *Regional Surface Transportation Program (RSTP)*

State

- *VW Mitigation Trust (retired)*
- *DRPT MERIT Capital Assistance*
- *SMART SCALE*

Federal

- *Federal Transit Administration (FTA) formula programs for transit capital (5307 & 5339)*
- *FTA Bus and Bus Facilities & Low-No Programs*
  - *Zero Emission Transition plans required*

BEB Next Steps

- Expand on Statewide BEB Analysis
- Assist transit agencies with applications for FTA discretionary funding
  - *Identify policy changes that encourage more applications for these programs and lower the state & local financial burden for bus replacements*
- Continued coordination with the Commonwealth's utility providers
- Consider long-term impacts to MERIT Capital and MERIT Operating programs

Questions?

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